MANAGEMENT OF RISIDUAL RISK ASSOCIATED WITH THE TRACADIE RANGE NEW BRUNSWICK – CANADA

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ABSTRACT

In 1995 the Canadian Department of National Defence (DND) adopted an innovative assessment strategy for the 18,088 hectare former artillery, mortar and air-to-ground training range at Tracadie, New Brunswick. This assessment was completed in December 1996 and the final report was submitted to the Department of National Defence in February 1997. The clearance strategy adopted at Tracadie Range was founded on the final assessment report and called for the clearance of specific portions of the property to defined levels of UXO clearance. The work began in 1997 and is scheduled for completion in 2001. A component of this innovative assessment method was to consider future land use as a major factor influencing the clearance plan. In support of that novel approach, DND has implemented a risk mitigation strategy that includes ongoing UXO support and the development of creative information products.

BACKGROUND

A decision was made at the outset of the project to limit clearance of the range to that required to accommodate specific future land uses. This allowed the department to conduct a cost-effective clearance while preserving the existing nature of the site as much as possible. This implies, however, that there is a residual risk associated with certain areas of the range that has to be recognized by both DND and the Province of New Brunswick (the Province). Now that two field seasons have been completed and the associated lands handed-over to the Province, DND is better able to define the likely residual risks and to develop a plan for the management of those liabilities. This presentation is aimed at

defining the residual risks associated with the clearance strategy adopted at Tracadie and outlining processes that will be put in place to manage those risks.

CLEARANCE STRATEGY INFLUENCING FACTORS

While a number of factors discussed below contributed to the choice of the selected clearance strategy, it was budgetary considerations that ultimately set the limitation on clearance options that could be followed. Realistically, the budget for clearance could only reflect the future value of land to potential users. The budget for the clearance strategy, based in part on the market value of the property, was established at $CAN21M. However, if a full level III clearance of the total range (18,000 hectares) was to be adopted the likely clearance budget would be in the area of $90M. Even if a strategy allowing for a level III clearance of identified impact and target areas and their immediate surround (5,000 hectares) had been selected the likely clearance budget would be $36M.

Having recognized the budgetary limitations imposed on the clearance, the key to the selection of the clearance strategy was the identification of likely future land uses given the existing resources contained within the range. To identify these aspects of the property a consultative process involving local residents and provincial authorities was undertaken. This process identified forestry, blueberry cultivation and recreational activities as likely future land uses. This process also identified that the ground intrusive activities associated with each of these uses would be limited, for the most part, to the top 30 cm of soil.

Once the likely future land use of the range had been established the identification of the extent of UXO contamination and the associated hazard was essential to the selection of the clearance strategy to be applied. The assessment survey identified seven impact or target areas and a likely ammunition preparation area within the range. Three of these areas were WW II era impact areas used for artillery and mortar training. The hazards associated with these were from HE and smoke filled munitions, including WP. A further three areas were identified as targets for air to ground attack training and were used by the Canadian Air Force from the late 1950s to the early 1990s. All ammunition used in these areas was of a practice nature and the hazards associated with these areas were from pyrotechnic filled ammunition only. The remaining area was a demolition zone used since the 1960s for the disposal of unserviceable ammunition. The hazards associated with this area are more varied and potentially the most significant on the range. The assessment survey also provided an estimate of the likely depth of UXO on the range. It is estimated that approximately 50 percent of all ammunition related items would be located in the top 15 cm of soil while 80 percent would be in the top 45 cm. Additionally, most UXO items in the aerial target areas were assessed as being at, or near the surface.

Environmental considerations and the value of existing natural resources also had an impact upon the selection of the clearance strategy. The Tracadie Range is heavily vegetated with both plantation and regrowth areas and is bisected by the Big Tracadie River, a significant salmonid watercourse. Consultation with both the local community and

provincial authorities placed significant emphasis on avoiding environmental degradation between, and during, clearance phases and on ensuring that the existing value of natural resources, particularly harvestable timber, was not diminished. It became very obvious that the clear-cutting of vegetation over large portions of the range to accommodate UXO clearance was not acceptable to the community or the Province.

SELECTED CLEARANCE STRATEGY

The clearance strategy adopted was a four level approach. The clearance of the identified air to ground attack target areas, where the hazards associated with identified ammunition items were considered low, was limited to a near surface clearance only. By adopting this approach the great majority of potential UXO items would be removed, the residual UXO risk would be low and the perception of hazards to future uses would be greatly reduced. This approach was also applied to the likely ammunition preparation area. The clearance strategy to be adopted for the WW II era impact areas and the demolition area was to be a level II clearance to 45 cm in depth. By adopting this approach the intrusive depth of identified future land uses was exceeded by 50 percent and the majority of potential UXO items would be identified and removed. Where infrastructure development such as roads or campsites were planned a level III clearance to exceed the planned depth of intrusion would be carried out. Areas outside the identified impact and target areas were not to be subjected to any clearance.

It was also decided that the clearance of the range would be undertaken as five separate annual clearances. This enabled DND to ensure a consistent quality of work while taking advantage of the competitiveness afforded by an annual tendering of the clearance contract. In addition it provided an opportunity for DND to regularly revisit the clearance strategy to evaluate the clearance results against the assessment predictions and to modify the clearance schedule, statements of work, clearance area boundaries and quality procedures, where necessary.

CLEARANCE TO DATE

Since the commencement of the clearance of the Tracadie Range in 1997, clearance operations have been undertaken in two WW II impact areas, one air-to-ground attack target area and the suspected ammunition preparation area. The work, to date, has been undertaken by two separate clearance contractors.

The locations of the impact areas as defined in the range assessment have been verified through the clearance effort and the estimated buffer areas surrounding each of the impact areas have also been confirmed as being reasonable and appropriate. There have been no surprises in the nature of UXO identified, the hazards presented, or in other ammunition related items found. Having said that, the proportion of WP filled items identified in one of the WW II impact areas was greater than assessed.

Although the assessed number of MK 106 Practice Aerial Bombs recovered from one specific air to ground target area was very accurate, the quantity of UXO and ammunition related items predicted by the assessment survey was generally over-estimated. From data provided by the clearance contractors, only four percent of identified items have been at depths greater than 45 cm, the limit of level II clearance on the Tracadie Range, whereas the assessment survey had suggested that the figure should be closer to twenty percent. Given the nature of the assessment survey and the site conditions at Tracadie Range, this is not unexpected and the original assessment methodology is considered valid.

The first year's contract was not completed according to schedule and some quality problems were identified. The outstanding work from year one was re-scheduled into year three and has required that the budget be adjusted accordingly. The second year's clearance was completed on schedule and within budget.

RESIDUAL RISK

As referred to above, DND has always recognized that there would be some residual risk associated with any clearance strategy adopted for the Tracadie Range. Equally, DND recognized that it had to quantify and mitigate those residual risks to the greatest degree possible. Within the Tracadie Range, residual risks may be categorized into two components; those related to the cleared areas and those related to the areas in which no clearance will be undertaken.

Within the cleared areas of the range, residual risk will be associated with UXO items not detected and cleared by the clearance contractor, with UXO items at depths greater than the required depth of clearance and with the selected clearance strategy applied to each identified target area.

To alleviate risks associated with the quality of clearance operations, DND has implemented an independent inspection and quality assurance process for the Tracadie project. This process defines the acceptance and rejection criteria to be applied to clearance operations and the inspection regime to be followed. It has been designed to monitor all aspects of the clearance operation, to ensure compliance with authorized plans and procedures, and to check the performance of clearance equipment. It provides for intrusive inspections of each clearance grid.

The validity of the quality process was highlighted during the first year's clearance operation where variation from approved plans and procedures and poor equipment performance and application were detected. During that year, in excess of 180 grids were rejected and were subjected to a further clearance. By contrast, during the second year's clearance operations few variations from plans and procedures were observed and only 13 grids were rejected.

The risks associated with UXO items at depths in excess of the selected clearance depth become a consideration when the anticipated intrusive impact of planned future land use is exceeded or when movement of the UXO occurs because of natural phenomena such as frost heave or erosion. At Tracadie, the limitation on future land use of the range area has been included in the land transfer agreement and it is recognized by the Province that any change to land use may require additional clearance effort. While the likelihood of intrusion of UXO into the cleared area as a result of frost heave has not been defined for the Tracadie Range, the frost heave effect is not considered great in northern New Brunswick. Given the very low numbers of UXO expected deeper than the clearance depth and the period of time that the items have been in the ground, the residual risk is considered low.

There are residual risks associated with the selection of the near surface clearance strategy adopted for the air to ground attack target areas because larger quantities of ammunition related items will remain at those sites. However, as with the areas of Level II clearance, the numbers of UXO will be low and the sensitivity of the items and the hazards presented are low. Here, once again, the residual risk is deemed low and is considered acceptable.

While some residual risk is known to exist in areas of the range not subjected to clearance, this is assessed as very low and is similarly considered acceptable. The areas identified for clearance, which encompass the artillery and mortar impact targets, have been shown to adequately accommodate the impact areas and surrounding buffer zones. Consequently, the risk from artillery and mortar UXO outside the cleared areas is considered low. On the other hand, expended Mk 106 Practice Aerial Bombs are known to be spread widely, even outside the range boundaries. While most of these items are found in the identified clearance areas, the method of delivery and the skill level of many of the users meant that many items did impact well away from the target area, and consequently a percentage of these items will be UXO. However, given the low expected number of UXO and the relative low sensitivity and low hazard presented by these items, the residual risk in areas not subjected to clearance has been assessed as acceptable.

DND PERSPECTIVE

The base closures of the 1990s were some of the most significant infrastructure reductions for the Canadian Department of National Defence in decades. The decision to close Tracadie Range as required under the 1994 reductions was the logical outcome of a reasoned analysis based on financial and operational considerations. That analysis revealed that the training conducted in New Brunswick could be accommodated at other facilities at minimal cost.

Having decided to close the range, it became apparent that this would be a significant undertaking. The property was huge and the local economic impact could be significant. In addition, the technology for range assessment and clearance was evolving and there was

a need to proceed cooperatively with the Province on the project especially when it came to the concepts of risk and the potential future use of the property.

Another aspect of the project had to do with public consultation and involvement. The idea of transferring a huge piece of property raised a number of issues for both DND and the Province of New Brunswick. It was clear from the outset that there would have to be extensive consultation between all parties, and with the public, if the project was to succeed. This was a key element of the project mandate.

For the Canadian Department of National Defence this project was both novel and challenging. It was an opportunity for the department to realize a cost saving in shedding the asset known as Tracadie Range with only a minimal impact on operational effectiveness. It served to foster a positive relationship between two levels of government by transferring a significant asset from on to the other, and it resulted in the development of an innovative UXO clearance and property disposal strategy that could be applied to other departmental range clearance projects.

PROVINICAL AND COMMUNITY PERSPECTIVE

Throughout the period of military control of the Tracadie Range there has been extensive use of the property by the local community for a variety of purposes including hunting, fishing and snowmobiling. In addition there has been commercial forestry and blueberry harvesting on the range for over 20 years. Despite recorded UXO discoveries and much anecdotal evidence of encounters with potential UXO items, most of the community believes that there is only a very slight hazard associated with the range. This attitude stems from the Community's desire to retain relatively unrestricted access to the range area and is reinforced by the lack of significant UXO incidents on the Range.

The Province of New Brunswick looks upon the range lands as containing valuable resources in an area of the province that has been faced with reduced commercial activity and with considerable pressure on existing natural resources. The Province has been transferred a significant forestry asset ranging from harvestable trees to new plantation areas which it has already begun to exploit. The Province is also preparing to lease cleared portions of the range for commercial blueberry operations.

While the Province has keenly accepted the range with restrictions applied to future land use it will accept no legal liability for UXO incidents. This rests solely with DND and the Canadian Government.

MITIGATION OF RISKS

Having recognized that there will be residual risks associated with the former Tracadie Range, DND has developed a number of mitigation strategies to help minimize both public

concern and provincial unease and to provide for an ongoing UXO response. This strategy encompasses three major thrusts; public information and education, support for provincial authorities, and UXO support.

A programme of community liaison has already commenced and is to be extended. The programme will emphasize the hazards associated with ammunition and will provide a guide to the identification of potentially hazardous items and the action to be taken if a suspicious object is encountered. The information provided will be associated with those items most likely to be encountered on the former range. The community liaison programme will include public meetings, school oriented lectures and presentations, the production of an information booklet, media advertisements and signing of specific areas.

The Province will be provided with information resources and briefings for those with direct responsibility for the former range. The information will be aimed at providing the provincial authorities with sufficient knowledge to make timely operating and future planning decisions. The packages, as well as providing UXO identification and action procedures, will identify more specifically the areas of the range that were impact areas, the extent of clearance undertaken in each and the likely residual hazards and their significance. A UXO database in a GIS format which will show the former impact areas and the aerial extent of identified UXO and other ammunition related data will be made available to the Province.

DND will continue to provide UXO support and response at the former range. It will also actively monitor the range through a number of sample sites in the identified former impact areas. A permanent contact will be identified within DND who will receive any inquiries concerning the site, who will have access to all the information related to the former range, and who will be able to respond decisively should any issues arise.

These three initiatives form the basis for the Department of National Defence's present risk mitigation approach at Tracadie Range. This is considered to be a sound framework upon which to proceed in the near term. As the project evolves, it is anticipated that there will be improvements and quite possibly additions to these concepts and procedures.

SUMMARY

The Canadian base closure programs of 1994 and 1995 lead to the need for a range clearance effort at Tracadie Range of a magnitude rarely seen in Canada. At the same time, fiscal prudence required the Department of National Defence to take a close look at the economics of the project and the risk associated with the previous use of the property.

Both DND and The Province of New Brunswick were eager to transfer ownership of the property and that mutual desire set the stage for the development of an innovative range clearance strategy based upon the future use of the site while recognizing that there would

remain some residual risk. That approach was possible, in part, because of the comprehensive risk management and communication programme that supports the project.

The fact that Tracadie Range was one of the first range clearance efforts to be initiated following the base closure announcements provided an opportunity for those involved to develop and adopt innovative processes and procedures. One of the significant outcomes has been the development of a comprehensive and effective quality assurance procedure that has subsequently been adopted for use on all Canadian range clearance projects.

From the Department's perspective, the Tracadie project experience has been overwhelmingly positive. In the end, the project will result in long-term cost savings due to reduced infrastructure costs, add to the knowledge base on range clearance operations, help to define new range clearance procedures, enhance inter-governmental relations, provide local economic benefit and promote discussion on all of these aspects of base closure, decommissioning, and disposal.